

### **REMARKS**

Claims 1-62 are pending in this Application. Reconsideration in view of the above amendments and the following remarks is respectfully requested.

#### **I. Claims Define Patentable Subject Matter**

The Office Action rejects claims 1-8, 16-18, 20-21, 29, 34-41, 49-51, 53-54, and 61-62 under 35 U.S.C. §103(a) as being unpatentable over Affes (US 2002/0051433) in view of Unser ("Sampling – 50 Years After Shannon", Proceedings of the IEEE, Vol. 88, No. 4: pages 569-587, April 2000); rejects claims 9-15, 19, 22-25, 30, 42-48, 52, and 55-58 under 35 U.S.C. §103(a) as being unpatentable over Affes in view of Unser and further in view of Agee (US 2003/0123384); rejects claims 26 and 59 under 35 U.S.C. §103(a) as being unpatentable over Affes in view of Unser, Agee, and further in view of Huang (USPN 6,370,129); rejects claims 27 and 60 under 35 U.S.C. §103(a) as being unpatentable over Affes in view of Unser and further in view of Shatti (USPN 7,076,168); rejects claim 28 under 35 U.S.C. §103(a) as being unpatentable over Affes in view of Unser and further in view of Langberg (USPN 5,852,630); and rejects claims 31-33 under 35 U.S.C. §103(a) as being unpatentable over Affes in view of Unser, Agee, and further in view of Baum (USPN 7,218,666). The Applicants respectfully traverse these rejections.

The Applicants disclose a novel and unobvious approach for processing signals that are sent over a wireless communication channel. For example, in accordance with an embodiment of the disclosure, a receiver may decode a received signal by sampling the received signal with a sampling frequency that is lower than the sampling frequency given by the Shannon theorem, but greater than the rate of innovation of the received signal. Such a decoding method may thus reduce the complexity and cost of receivers while retaining equivalent decoding performances.

Amended claim 1 recites, *inter alia*, “sampling the received signal ( $y(t)$ ) with a sampling frequency ( $f_s$ ) lower than the sampling frequency given by the Shannon theorem, but greater than the rate of innovation ( $\rho$ ) of said received signal ( $y(t)$ ), for generating a set of sampled values ( $y(nT_s)$ )” (emphasis added). Claims 28, 34, and 61-62 recite similar features.

In rejecting claim 1, the Examiner acknowledges that the primary reference, Affes, does not disclose or suggest sampling the signal with a sampling frequency that is greater than the rate of innovation of the signal, as recited in claim 1, yet relies on Unser to make up for the lack of disclosure in Affes.

The Examiner, at pages 2-3 of the Office Action, cites section V, B of Unser, and asserts that “one of ordinary skill in the art at the time of the invention would clearly recognize that Unser defines a minimum sampling requirement . . . and that sampling above the minimum requirements has the benefits of increasing the accuracy of a sampled signal, thus less bit errors in the recovered signal.” The Applicants respectfully disagree. As stated in Applicants’ Response dated June 17, 2008, Unser, at section V, B, lines 7-9, specifically states that “a reconstruction is generally possible provided there are as many measurements as there are degrees of freedom in the signal representation” (emphasis added), and nowhere whatsoever suggests that the number of measurements of a signal should be greater than the degrees of freedom of that signal.

In attempting to support the allegation that the features of claims 1, 28, 34, and 61-62 are obvious in view of Unser, the Examiner cites to Heminger (US 2002/0054411), and assert that the “benefits of sampling above the minimum requirements are well known and expected in the art.” Specifically, the Examiner points to paragraph [0060] of Heminger and states that “sampling at a rate of 5 times of the minimum requirement . . . increases system accuracy as

compared to sampling at a rate of 2 times the minimum requirement.” It appears that the Examiner is taking the position that, because a higher sampling rate in Heminger may potentially provide some beneficial results, it would have been obvious for one of ordinary skill in the art to modify the device of Unser to perform a greater number of measurements than there are “degrees of freedom in the signal representation.” The Applicants respectfully disagree.

Heminger discloses a method for aligning optical wireless links via a specific protocol. As discussed in paragraph [0060] of Heminger, as cited by the Examiner, the protocol allows for transmission of control packets over a modulated light beam at a rate greater than the rate at which the light beam position information is updated. Heminger refers to this higher rate transmission of packets as “over-sampling.” Heminger also states that the chances of aligning the light beam are “significantly increased by sending the control packets five times as often.” Regardless of whether the greater control packet transmission rate is beneficial to the alignment of the optical wireless links, it is clear that Heminger has nothing whatsoever to do with processing signals that are sent over a wireless communication channel, as recited in the claims. Furthermore, Heminger fails to disclose a “rate of innovation,” let alone sampling a received signal with a sampling frequency lower than the sampling frequency given by the Shannon theorem, but greater than the rate of innovation, as expressly recited in claims 1, 28, 34, and 61-62. According to the present specification, at page 5, lines 28-29, the “rate of innovation” of a signal, as recited in claim 1, may be defined as the number of degrees of freedom of the signal per unit of time. There is also no mention of the “number of degrees of freedom” anywhere in Heminger. Accordingly, the Applicants respectfully submit that, due to the lack of any relevant disclosure of Heminger, one of ordinary skill in the art would not be motivated to modify the

device of Unser to perform a greater number of measurements than there are degrees of freedom in the signal representation.

Secondary references Agee, Huang, Shatti, Langberg, Baum, either individually or in combination with Affes, Unser, and Heminger, also fail to suggest or disclose a method including at least sampling a signal with a sampling frequency that is greater than the rate of innovation, as recited in claims 1 and 28, 34, and 61-62, and as such, fail to make up for the deficiencies of Affes, Unser, and Heminger.

In accordance with the above remarks, the Applicants respectfully submit that Affes, Unser, Heminger, Agee, Huang, Shatti, Langberg, Baum, either individually or in combination, fail to disclose or suggest at least the sampling frequency feature recited in claims 1, 28, 34, and 61-62.

Accordingly the Applicants submit that claims 1, 28, 34, and 61-62 define patentable subject matter. Claims 2-33 and 35-60 depend from claims 1 and 34, respectively, and therefore, also define patentable subject matter.

## II. Conclusion

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance. Favorable reconsideration and prompt allowance of claims 1-62 are earnestly solicited.

Should the Examiner believe that anything further would be desirable in order to place this application in even better condition for allowance, the Examiner is requested to contact the undersigned at the telephone number set forth below.

Application Serial No. 10/680,839  
Amendment dated November 18, 2008  
Reply to Final Rejection of September 19, 2008

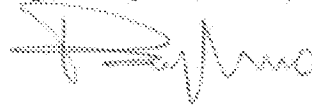
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Dated: 11/18/08

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Respectfully Submitted,



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